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REDUCTION

PREVENTION OF RETINAL INIURY AND DEGENERATION BY
SPECIFIC FACTORS

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This application claims priority of United States Patent Application Serial No. 08/334,859 filed November 4, 1994, ^{now U.S. Patent 5,667,968,} which is a continuation of United States Patent Application Serial No. 07/836,090 filed February 14, 1992, ^{now abandoned,} which is a continuation-in-part of United States Patent Application Serial No. 07/691,612 filed April 25, 1991, ^{now U.S. Patent 5,438,121,} which is a continuation-in-part of United States Patent Application Serial No. 07/570,657 filed August 20, 1990 and issued as United States Patent No. 5,229,500, which is a continuation-in-part of Serial No. 07/400,591 filed on August 30, 1989 and issued as United States Patent No. 5,180,820.

INTRODUCTION

The present invention relates to a method of preventing or delaying retinal degeneration caused by exposure to light or other environmental trauma, or by any pathological condition wherein death or injury of retinal neurons or photoreceptors occurs. It is based on the discovery that specific survival promoting factors, when introduced into the living mammalian eye, prevent damage and degeneration of photoreceptors caused by light and on the further discovery that such factors can delay photoreceptor degeneration associated with inherited diseases of the retina.

BACKGROUND OF THE INVENTION

Trophic factors play a major role in neuronal survival and growth during development, in addition to the maintenance of differentiated neurons. Such factors also appear to play a role in the survival and regeneration of injured neurons in the central as well as in the peripheral nervous system.

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must be injected to attain a sufficient concentration at the site of the retina. In addition, systemic toxic effects may result from the injection of certain agents.

Other than the use of bFGF to delay inherited photoreceptor degeneration in
5 RCS rats, there is no demonstrated use of any specific neurotrophic or other cellular
factor to prevent injury or death of mammalian photoreceptors. In copending U. S.
application 07/400,591, ^{now US Patent 5,180,820,} which is incorporated by reference herein, a BDNF expressing
clone was isolated from a retinal cDNA library. Based on that discovery, as well as
the expression for the first time of purified BDNF using recombinant technology, a
10 means was provided for the use of a purified neurotrophic factor for the treatment
of diseases such as retinitis pigmentosa and other retinal degenerations. As
described in greater detail below, the efficacy of BDNF, in addition to other
neurotrophic and cellular factors, has been demonstrated, providing the first
pharmacological means to treat most forms of inherited, age-related or
15 environmentally-induced retinal degenerations.

SUMMARY OF THE INVENTION

20 An object of the present invention is to provide a method of preventing injury
or death of retinal neurons.

Another object of the invention is to provide a method of treating pathological
diseases wherein degeneration of the retina occurs.

25 Yet another object of the invention is to provide a method of treating the
living eye prior to or following exposure to light or other environmental trauma
thereby preventing degeneration of retinal cells.

A further object of the present invention is to provide a method of preventing
30 photoreceptor injury and degeneration in the living eye.